

## CLAIMS

1. A guard mechanism (200) attachable to a syringe (100) to make it into a disposable automatic safety syringe, said syringe (100) comprising:
- a syringe body (1) hollow on the inside and open at the front and rear,
  - a plunger (4) sliding inside the syringe body (1) with an injection stroke extending from a retracted syringe-filling position to a forward syringe-emptying position, said plunger (4) being provided at the rear with a shaft (41) that can be operated manually and brought out of the syringe body by means of the rear end (42) thereof, and
  - an injection needle (2) incorporated into a needle-carrier (20) engageable in the head (115) of the syringe body (1),
- characterised in that said guard mechanism (200) can be pre-assembled and comprises:
- a sleeve (5) that can be slidably mounted on said syringe body (1),
  - a spring (7) housed in said sleeve (5),
  - a abutment member (8) for said spring (7), also housed in said sleeve (5) and able to be made integral with the front part of said syringe body (1).
2. A mechanism (200) according to claim 1, characterised in that in said pre-assembled condition, said abutment member (8) for said spring (7) is retained by locking means (66) in the form of flexible tongues protruding inward from said sleeve (5).
3. A mechanism (200) according to claims 1 and 2, characterised in that in during operation said sleeve (5) is slidably mounted on said syringe body (1), to pass from a retracted position of use of the syringe, to a forward position of safety, wherein it covers said needle (2), and

said spring (7) is disposed under compression in the front part of said sleeve (5), between said sleeve (5) and said abutment member (8) made integral with said syringe body (1), to urge the axial movement of the sleeve (5) with respect to the syringe body, there also being provided:

- locking means (66, 11) disposed in the rear part of the sleeve (5) and in the rear part of the syringe body (1), in reciprocal engagement, to keep the sleeve locked in the retracted position of use against the action of said spring (7), and
- operating means (43) disposed in said shaft (41) to release said locking means (56), when the plunger (4) reaches the end of the injection stroke, so as to allow the axial movement of the sleeve into the safety position, thanks to the action of said spring (7).

4. A mechanism (200) according to any one of the preceding claims, characterised in that said abutment member (8) comprises:

- a cylindrical or frusto-conical body (80), hollow on the inside to be applied to the front part of the syringe body (1), e
- a cylindrical or frusto-conical tang (82) with a smaller diameter than the body (80) and protruding forward therefrom so as to give rise to a shoulder (84).

5. A mechanism according to claim 4, characterised in that said spring is a spiral spring (7) disposed in the front part (51) of the sleeve, around the tang (82) of the abutment member, with one end of the spring (7) abutting against a collar (52) protruding inward in the front edge of the front part (51) of the sleeve and the other end of the spring abutting against the shoulder (84) of the abutment member.

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6. A mechanism (200) according to any one of the preceding claims, characterised in that formed in said sleeve (5) are locking means (56, 66) cooperating with said abutment member (8) to lock the sleeve when it is in its forward position of safety.

7. A mechanism (200) according to claim 6, characterised in that said locking means (56, 66) to lock the sleeve (5) in the forward position of safety comprise a pair of front tongues (56) opposed to a pair of rear tongues (66) formed in said sleeve (5), said pair of front tongues (56) having rear abutment surfaces (58) able to abut against the shoulder (84) of the abutment member (8) and said pair of rear tongues (66) having front abutment surfaces (68) to abut against the rear edge of the body (80) of the abutment member.

8. A mechanism according to claim 7, characterised in that said pairs of opposed tongues (56, 66) of the sleeve are flexible and are formed by means of substantially U-shaped opposed cuts (57, 67) in the sleeve body, to be able to bend radially inward and outward with respect to the sleeve.

9. A mechanism according to any one of the preceding claims, characterised in that said locking means for locking the sleeve (5) in the retracted position of use comprise a collar (11) protruding radially outward from the rear edge of the syringe body (1) able to abut against said flexible rear tongues (66) formed in the rear part of the sleeve (5), said flexible tongues (66) ending in respective abutment surfaces (68) able to abut against said collar (11) to retain the syringe body.

10. A mechanism according to claim 9, characterised in that said flexible tongues (66) are inclined slightly inward to

cooperate with said circular operating crown (43), when the plunger is at the end of the injection stroke.

11. A mechanism according to any one of the preceding  
5 claims, characterised in that said sleeve (5) has outwardly protruding gripping means (53), to give rise to a resting surface for the user's fingers.

12. A disposable automatic safety syringe (100) comprising:  
10 .- a syringe body (1) hollow on the inside and open at the front and rear,  
- a plunger (4) sliding in the syringe body (1) with an injection stroke extending from a retracted syringe-filling position to a forward syringe-emptying position, said  
15 plunger (4) being provided at the rear with a shaft (41) that can be operated manually and brought out of the syringe body by means of the rear end (42) thereof,  
- an injection needle (2) supported by a needle-carrier (20) engageable to the front end (13) of the syringe body  
20 (1),  
- a sleeve (5) slidably mounted over said syringe body (1), to pass from a retracted position of use of the syringe wherein the needle protrudes forward therefrom, to a forward position of safety, wherein it covers said needle  
25 (2),  
characterised in that it further comprises:  
- a abutment member (8) able to be made integral with the front part of the syringe body (1),  
- spring means (7) disposed under compression in the front  
30 part of said sleeve (5), between said sleeve (5) and said abutment member (7) to urge the axial movement of the sleeve (5) with respect to the syringe body,  
there further being provided:  
- locking means (66, 11) provided in the rear part of the  
35 sleeve (5) and in the rear part of the syringe body (1), in reciprocal engagement, to keep the sleeve locked in the

retracted position of use against the action of said spring means (7), and

- operating means (43) disposed in said shaft (41) to disengage said locking means (66), when the plunger (4) reaches the end of the injection stroke, so as allow axial movement of the sleeve into the safety position, thanks to the action of said spring means (7).

13. A syringe (100) according to claim 12, characterised in that said abutment member (8) comprises:

- a cylindrical or frusto-conical body (80), hollow on the inside to be applied to the front part of the syringe body (1), and
- a cylindrical or frusto-conical tang (82) with a smaller diameter than that of the body (80) and protruding forward therefrom so as to give rise to a shoulder (84).

14. A syringe according to claim 13, characterised in that said spring means comprise a spiral spring (7) disposed inside the front part (51) of the sleeve, around the tang (82) of the abutment member, with one end of the spring abutting against a collar (52) protruding inward in the front edge of the front part (51) of the sleeve and the other end of the spring abutting against the shoulder (84) of the abutment member (8).

15. A syringe according to any of claims 12 to 14, characterised in that in said sleeve (5) there are formed locking means (56, 66) cooperating with said abutment member (8) to lock the sleeve when it is in its forward position of safety, said locking means (56, 66) comprising a pair of front tongues (56) opposed to a pair of rear tongues (66) formed in said sleeve (5), said pairs of front tongues (56) having rear abutment surfaces (68) able to abut against said shoulder (84) of the abutment member (8) and said pair of rear tongues (66) having front abutment

surfaces (68) able to abut against the rear edge of the body (80) of the abutment member (8).

5 16. A syringe according to claim 15, characterised in that said locking means for locking the sleeve (5) in the retracted position of use comprise a collar (11) protruding radially outward from the rear edge of the syringe body (1) and able to abut against the pair of flexible rear tongues (66) formed in the rear part of the sleeve (5).

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17. A syringe according to any one of claims 12 to 16, characterised in that in the rear part of said shaft (41) of the plunger (4) there is provided a safety tab removable by the user and able to abut against the rear edge of the sleeve (5) to prevent the plunger from reaching the end of the injection stroke.

18. A syringe according to any one of claims 13 to 17, characterised in that said tang (82) of the contrast element (8) is shaped on the inside as a Luer cone to support the needle-carrier (20).

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